

niently reckoned from the lowest and thickest part of the Bubble upwards.

O B S. XIX.

Viewing in several oblique positions of my Eye the Rings of Colours emerging on the top of the Bubble, I found that they were sensibly dilated by increasing the obliquity, but yet not so much by far as those made by thin'd Air in the seventh Observation. For there they were dilated so much as, when viewed most obliquely, to arrive at a part of the plate more than twelve times thicker than that where they appeared when viewed perpendicularly; whereas in this case the thickness of the Water, at which they arrived when viewed most obliquely, was to that thickness which exhibited them by perpendicular rays, something less than as 8 to 5. By the best of my Observations it was between 15 and $15\frac{1}{2}$ to 10, an increase about 24 times less than in the other case.

Sometimes the Bubble would become of an uniform thickness all over, except at the top of it near the black Spot, as I knew, because it would exhibit the same appearance of Colours in all positions of the Eye. And then the Colours which were seen at its apparent circumference by the obliquest rays, would be different from those that were seen in other places, by rays less oblique to it. And divers Spectators might see the same part of it of differing Colours, by viewing it at very differing obliquities. Now observing how much the Colours at the same places of the Bubble, or at divers places of equal thickness, were varied by the several

several obliquities of the rays; by the assistance of the 4th, 14th, 16th and 18th Observations, as they are hereafter explained, I collect the thickness of the Water requisite to exhibit any one and the same Colour, at several obliquities, to be very nearly in the proportion expressed in this Table.

Incidence on the Water.		Refraction in- to the Water.		Thickness of the Water.
deg.	min.	deg.	min.	
00	00	00	00	10
15	00	11	11	$10\frac{1}{4}$
30	00	22	1	$10\frac{1}{5}$
45	00	32	2	$11\frac{1}{5}$
60	00	40	30	13
75	00	46	25	$14\frac{1}{2}$
90	00	48	35	$15\frac{1}{5}$

In the two first Columns are expressed the obliquities of the rays to the superficies of the Water, that is, their Angles of incidence and refraction. Where I suppose that the Sines which measure them are in round numbers as 3 to 4, though probably the dissolution of Soap in the Water, may a little alter its refractive Vertue. In the third Column the thickness of the Bubble, at which any one Colour is exhibited in those several obliquities, is expressed in parts, of which ten constitute that thickness when the rays are perpendicular.

I have sometimes observed, that the Colours which arise on polished Steel by heating it, or on Bell-metal, and some other metalline substances, when melted and

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